BEFORE THE

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PREPARED DIRECT TESTIMONY

OF

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VICE PRESIDENT
AUS CONSULTANTS - UTILITY SERVICES

ON BEHALF OF

CAROLINA WATER SERVICE, INC.

CONCERNING

FAIR RATE OF RETURN

APRIL 2005

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I. INTRODUCTION

Q. Please state your name, occupation and business address.

A. My name is Pauline M. Ahern and I am a Vice President of AUS Consultants - Utility Services. My business address is 155 Gaither Drive, P.O. Box 1050, Moorestown, New Jersey 08057.

Q. Please summarize your educational background and professional experience.

A. I am a graduate of Clark University, Worcester, MA, where I received a Bachelor of Arts degree with honors in Economics in 1973. In 1991, I received a Master of Business Administration with high honors from Rutgers University.

In June 1988, I joined AUS Consultants - Utility Services as a Financial Analyst and am now a Vice President. I am responsible for the preparation of all fair rate of return and capital structure exhibits for AUS Consultants - Utility Services. I have offered expert testimony on behalf of investor-owned utilities before twenty state regulatory commissions. The details of these appearances, as well as details of my educational background, are shown in Appendix A supplementing this testimony.

I am also the Publisher of AUS Utility Reports (formerly C.A. Turner), responsible for the production, publication, distribution and marketing of these reports. AUS Utility Reports provides financial data and related ratios covering approximately 150 public utility companies on a monthly, quarterly, and annual basis. Coverage includes electric, combination gas and electric, gas distribution, gas transmission, telephone, water and international utilities.

I also calculate and maintain the A.G.A. Index under contract with the American Gas Association (A.G.A.). The A.G.A. Index is a market capitalization weighted index of the common stocks of about 70 corporate members of the A.G.A.

I have co-authored an article with Frank J. Hanley, President, AUS Consultants - Utility Services entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994. I also assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I am a member of the Society of Utility and Regulatory Financial Analysts, formerly the National Society of Rate of Return Analysts serving as Secretary/Treasurer for 2004-2006. In 1992, I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the National Society of Rate of Return Analysts. This designation is based upon education, experience and the successful completion of a comprehensive written examination.

I am an associate member of the National Association of Water Companies, serving on its Finance Committee, and a member of the Energy Association of Pennsylvania, formerly the Pennsylvania Gas Association.

Q. What is the purpose of your testimony?

A. The purpose is to provide testimony on behalf of Carolina Water Service, Inc. (CWS or the Company) in the form of a study of the fair rate of return, including common equity cost rate, senior capital cost rate and capital structure, which it should be afforded the opportunity to earn on its jurisdictional water and sewer rate bases.

Q. What is your recommended overall fair rate of return range?

A. I recommend that the Public Service Commission of South Carolina (PSC SC or the Commission) authorize the Company the opportunity to earn an overall rate of return in the range of 8.96% to 9.00% based upon the consolidated capital structure at December 31, 2003 of Utilities, Inc., the parent of CWS, which consisted of 59.23% debt and 40.07% common equity at a debt cost rate of 7.28% and my recommended common equity cost rate range of 11.40% to 11.50%.

Q. Have you prepared an exhibit which supports your overall recommended fair rate of return?

A. Yes, I have. It has been marked for identification as Exhibit No. ___ and consists of Schedules PMA-1 through PMA-12. Hereinafter, references to Schedules within this testimony will be from this Exhibit, unless otherwise noted.

II. SUMMARY

Q. Please summarize your recommended overall cost of capital range.

A. The overall cost of capital range of 8.96% to 9.00% is based upon the consolidated capital structure and related ratios and fixed capital cost rate at December 31, 2003 of Utilities, Inc. which are summarized on Schedule PMA-1, page 1.

The overall cost of capital is summarized in Table 1 below:

Table 1

	Capital Structure Ratios	Cost Rate	Weighted Return
Debt	59.23%	7.28%	4.31%
Common Equity	40.77	11.40 to 11.50	4.65 – 4.69
Total	100.00%		8.96% - 9.00%

As explained in more detail below, my analysis reflects current capital market conditions and results from the application of four well-tested market-based cost of common equity models, the Discounted Cash Flow (DCF) approach, the Risk Premium Model (RPM), the Capital Asset Pricing Model (CAPM), and the Comparable Earnings Model (CEM).

Q. Please summarize your recommended common equity cost rate range of 11.40% to 11.50%.

A. The basis of the 11.40% to 11.50% range of common equity cost rate recommendation is summarized on Schedule PMA-1, page 2. Because CWS's common stock is not publicly traded, market-based common equity cost rates cannot be determined directly for CWS. Therefore, in arriving at my recommended common equity cost rate range of 11.40% to 11.50%, I assessed the market-based cost rates of companies of relatively similar risk, i.e., proxy group(s), for insight into a recommended common equity cost rate applicable to CWS and suitable for cost of capital purposes. It is appropriate to look to a proxy group or groups of companies as similar in risk as possible whose common stocks are actively traded for insight into an appropriate common equity cost rate applicable to CWS and then adjust the results upward to reflect CWS's greater investment risk (vis-à-vis the proxy group(s)). Using other utilities of relatively comparable risk as proxies is consistent with the principles of fair rate of return established in the Hope[1] and Bluefield[2] cases and adds reliability to the informed expert judgment used in arriving at a recommended common equity cost rate. However, no proxy group can be selected to be identical in risk to CWS and therefore, the proxy group(s)' results must be adjusted to reflect the greater relative investment risk of CWS as will be subsequently discussed in detail. Therefore, I have evaluated the market data of two proxy groups of water companies in arriving at my recommended common equity cost rate. The bases of selection are described below.

As explained in more detail below, my analysis reflects current capital market conditions and results from the application of four well-tested market-based cost of common equity models, the Discounted Cash Flow (DCF) approach, the Risk Premium Model (RPM), the Capital Asset Pricing Model (CAPM), and the Comparable Earnings Model (CEM).

The results derived from each are as follows:

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[1] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).

[2] Bluefield Water Works Improvement Co. v. Public Serv. Comm'n, 262 U.S. 679 (1922).

Table 2

	Proxy Group of Six AUS Utility Reports Water Cos.		Proxy Group of Three Value Line (Std. Ed.) Water Cos.
Discounted Cash Flow Model	10.6%		10.8%
Risk Premium Model	10.6		10.8
Capital Asset Pricing Model	10.2		10.4
Comparable Earnings Model	14.5		14.4
Indicated Range of Common Equity Cost Rate Before Investment Risk Adjustment	10.90%	-	11.00%
Investment Risk Adjustment	0.50		0.50
Recommended Range of Common Equity Cost Rate After Adjustment for Investment Risk	11.40%	-	11.50%

After reviewing the cost rates based upon the four models, I conclude that a range of common equity cost rate of 10.90% to 11.00% is indicated before an investment risk adjustment. After applying a conservative investment risk adjustment due to CWS's small size vis-a-vis the two proxy groups as will be discussed in detail subsequently, my recommended range of common equity cost rate is 11.40% to 11.50%.

III. GENERAL PRINCIPLES

Q. What general principles have you considered in arriving at your recommended common equity cost rate range of 11.40% to 11.50%.

A. In unregulated industries, marketplace competition is the principal determinant of the price of a product or service. In the case of regulated public utilities, regulation must act as a substitute for marketplace competition. Consequently, marketplace data must be relied upon to assure that the utility can fulfill its obligations to the public and provide adequate service at all times. This requires a level of earnings sufficient to maintain the integrity of presently invested capital and permit the attraction of needed new capital at a reasonable cost in competition with other comparable-risk firms. These standards for a fair rate of return have been established by the U.S. Supreme Court in the Hope and Bluefield cases cited previously. Consequently, in my determination of a fair rate of return, I have also evaluated data gathered from the marketplace for utilities as similar in risk as possible to CWS.

IV. BUSINESS RISK

Q. Please define business risk and explain why it is important to the determination of a fair rate of return?

A. Business risk incorporates all of the risks of a firm other than financial risk, which will be discussed subsequently. Examples of business risk include the quality of management and the regulatory environment which have a direct bearing on earnings.

Business risk is important to the determination of a fair rate of return because the greater the level or risk, the greater the rate of return investors demand, consistent with the basic financial precept of risk and return.

Q. Please discuss the business risks facing the water industry in general.

A. The water utility industry faces significant risks related to replacing aging transmission and distribution systems. Value Line Investment Survey[3] observes:

> Industry regulations in the water industry continue to be demanding. Although the Safe Drinking Water Act (SDWA) of 1974 remains the

[3] Value Line Investment Survey, January 28, 2005.

> authority surrounding the safety and purity of drinking water, an amendment in 1996 authorized the Environmental Protection Agency (EPA) to step up local compliance levels. Now the EPA works with local and state governments to oversee the safety of drinking water. However, these standards will likely only become more stringent in the next few years, as the aging of current facilities and the threat of terrorist activity ought to result in tighter standards. The majority of the current water systems are over a century old and require a make over. Costs associated with the updates are likely to grow into the hundreds of billions of dollars over the next decade or two. Strapped local and federal capital reserves will force water companies to meet the higher capital requirement levels alone.
>
> Many smaller water companies lack the capital requirements to keep up with the rising costs associated with staying in compliance with government standards.

In addition, because the water industry is much more capital-intensive than the electric, natural gas or telephone industries, the investment required to produce a dollar of revenue is greater. And, because investor-owned water utilities typically do not receive federal funds for infrastructure replacement, the challenge to investor-owned water utilities is exacerbated and their access to financing is restricted, thus increasing risk.

The water utility industry also experiences lower relative depreciation rates. Lower depreciation rates, as one of the principal sources of internal cash flows for all utilities, mean that water utility depreciation as a source of internally-generated cash is far less than for electric, natural gas or telephone utilities. Water utilities' assets have longer lives and, hence, longer capital recovery periods. As such, water utilities face greater risk due to inflation which results in a higher replacement cost per dollar of net plant than for other types of utilities.

In addition, as noted by S&P[4]:

[4] Standard & Poor's, Criteria: Infrastructure Finance, Water and Wastewater Utilities, Projects and Concessions, September 1998, p. 47.

Environmental regulations, which can be particularly stringent for water utilities, impact credit quality. Mandatory compliance with environmental legislation is often quite capital intensive. This is particularly so in the areas of wastewater discharge and drinking water quality. In most jurisdictions observed by Standard & Poor's, pressures from environmental standards is likely to increase. High compliance costs can impact a water utility's creditworthiness if their financing is up-front and their recovery is over a long period, potentially putting stress on the financial profile in the short term.

A key rating consideration is the extent of the link between a water utility's legislated environmental standards and its rate-setting mechanism. Stringent environmental rules requiring expensive upgrade and compliance costs are not necessarily a negative rating factor, so long as the utility has a flexible and transparent process for passing the costs through to consumers, and these consumers are willing and able to bear these costs. Standard & Poor's considers whether the environmental and economic regulators are acting in isolation, or perhaps have different constituencies.

Moody's[5] also notes that:

We expect that the credit quality of the investor-owned U.S. water utilities will likely deteriorate over the next several years, due to ongoing large capital spending requirements in the industry. Larger capital expenditures facing the water utility industry result from the following factors:

- Continued federal and state environmental compliance requirements;
- Higher capital investments for constructing modern water treatment and filtration facilities;
- Ongoing improvement of maturing distribution and delivery infrastructure; and
- Heightened security measures for emergency preparedness designed to prevent potential terrorist acts.

Given the overwhelming importance of protecting the public health, the water utility industry remains regulated by the federal and state regulatory agencies. As a result of this importance, the level of state regulators' responsiveness is critical in enabling the water utilities to maintain their financial integrity. In addition, when utilities are permitted a fair rate of return and timely rate

[5] Moody's Investors Service, Global Credit Research, "Credit Risks and Increasing for U.S. Investor Owned Water Utilities", Special Comment, January 2004, p. 5.

adjustments to reflect the costs of providing this essential service, they will be more able to implement the necessary safeguards to protect the public health.

In addition, the water utility industry, as well as the electric and natural gas utility industries, faces the need for increased funds to finance the increasing security costs required to protect the water supply and infrastructure from potential terrorist attacks in the post-September 11, 2001 world.

In view of the foregoing, it is clear that their high degree of capital intensity coupled with the need for substantial infrastructure capital spending and increased anti-terrorism security spending, require regulatory support in the form of adequate and timely rate relief so water utilities will be able to successfully meet the challenges they face.

Q. Does CWS face additional extraordinary business risk?

A. Yes. CWS's smaller size, i.e., assets and liabilities of $34.118 million at June 30, 2004 (see page 3 of Schedule PMA-1) vis-à-vis average total capital of $502.690 million in 2003 for the proxy group of six AUS Utility Reports water companies (see page 3 of Schedule PMA-1), $865.130 million for the proxy group of three Value Line (Std. Ed.) water companies indicates greater relative business risk because all else equal, size has a bearing on risk.

Q. Please explain why size has a bearing on business risk.

A. Smaller companies are less capable of coping with significant events which affect sales, revenues and earnings.

The loss of revenues from a few larger customers, for example, would have a greater effect on a small company than on a much larger company with a larger customer base. Because CWS is the regulated utility to whose rate base the PSC SC ultimately allowed overall cost of capital and fair rate of return will be applied, the relevant risk reflected in the cost of capital must be that of CWS, including the impact of its small size on common equity cost rate. Size is an important factor which affects common equity cost rate, and CWS is significantly smaller than the average company in each proxy group based upon total investor-provided capital as shown below:

Table 3

	2003 Total Capital ($ millions)	Times Greater than The Company	Market Capitalization(1) ($ Millions)	Times Greater than the Company
Proxy Group of Six AUS Utility Reports Water Companies	$502.690	14.7x	$623.771	20.2x
Proxy Group of Three Value Line (Std. Ed.) Water Companies	865.130	25.4x	1,101.438	34.9x
CWS	34.118		30.825 (2) 31.580 (3)	

(1) From Schedule PMA-1, page 3.
(2) Based upon the average market-to-book ratio of the proxy group of six AUS Utility Reports water companies.
(3) Based upon the average market-to-book ratio of the proxy group of three Value Line (Std. Ed.) water companies.

I have also done a study of the market capitalization of the proxy groups of six AUS Utility Reports water companies and three Value Line (Std. Ed.) water companies. The results are shown on page 5 of Schedule PMA-1 which summarizes the market capitalizations as of March 28, 2005.

CWS's common stock is not publicly traded. Consequently, I have assumed that if it were publicly traded, its consolidated common shares would be selling at the same market-to-book ratio as the average market-to-book ratio for each proxy group, or 232.8% (six water companies) and 238.5% (three water companies) at March 28, 2005. Hence, CWS's market capitalization is estimated at $30.825 million and $31.580 million based upon the average market-to-book ratios of each proxy group, respectively, as of March 28, 2005. In contrast, the market capitalization of the average AUS Utility Reports water company was $623.771 million on March 28, 2005, or 20.2 times larger than CWS's estimated market capitalization. In addition, the market capitalization of the average Value Line (Std. Ed.) water company was $1,101.438 million at March 28, 2005, or 34.9 times larger than CWS. It is conventional wisdom, supported by actual returns over time, and a general premise contained in basic finance textbooks, that smaller companies tend to be more risky causing investors to expect greater returns as compensation for that risk.

Q. Does the financial literature affirm a relationship between size and common equity cost rate?

A. Yes. Brigham[6] states"

> A number of researchers have observed that portfolios of small-firms have earned consistently higher average returns than those of large-firms stocks; this is called "small-firm effect." On the surface, it would seem to be advantageous to the small firms to provide average returns in a stock market that are higher than those of larger firms. In reality, it is bad news for the small firm; what *the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of the large firms*. (italics added)

V. FINANCIAL RISK

Q. Please define financial risk and explain why it is important to the determination of

[6] Eugene F. Brigham, Fundamentals of Financial Management, Fifth Edition, The Dryden Press, 1989, p. 623.

a fair rate of return?

A. Financial risk is the additional risk created by the introduction of senior capital, i.e., debt and preferred stock, into the capital structure. In other words, the higher the proportion of senior capital in the capital structure, the higher the financial risk.

Utilities formerly were considered to have much less business risk vis-a-vis unregulated enterprises, and, as a result, a larger percentage of debt capital was acceptable to investors. In June 2004, S&P revised its utility financial guidelines and assigned new business profile scores to U.S. utility and power companies to better reflect the relative business risk among companies in the sector. S&P's revised financial guidelines to the bond rating process for utilities can be found in Schedule PMA-2, page 14, while pages 1 through 9 describe the utility bond rating process. As shown on page 14, S&P's revised financial guidelines for utilities establishes financial target ratios for ten levels of business position/profile with "1" being considered lowest risk and "10" being highest risk.

As shown on Schedule PMA-10, page 2, the average S&P bond rating (issue credit rating) and business profile of the six AUS Utility Reports water companies is A+ and "2.6", which rounds to "3" and A+/A and "2.7" (rounded to "3"), for the three Value Line (Std. Ed.) water companies.

Q. How can one measure the combined business and financial risks, i.e., investment risk of an enterprise?

A. Similar bond ratings/issue credit ratings reflect similar combined business and financial risks, i.e., total risk. Although the specific business or financial risks may differ between companies, the same bond rating indicates that the combined risks are similar as the bond rating process reflects acknowledgment of all diversifiable business and financial risks. For example, S&P expressly states that the bond rating process encompasses a qualitative analysis of business and financial risks (see pages 3 through 9 of Schedule PMA-2). There is no perfect single proxy, such as bond rating or common stock ranking, by which one can differentiate common equity risk between companies. However, the bond rating provides a useful means to compare/differentiate common equity risk between companies because it is the result of a thorough and comprehensive analysis of all diversifiable business and financial risks, i.e., investment risk.

The Company's ratemaking common equity ratio of 40.77% is somewhat lower than the average 2003 total equity ratios of the six AUS Utility Reports water companies, 42.73%, as can be gleaned from the information shown on page 3 of Schedule PMA-3 and of the three Value Line water companies, 42.69%, as shown on page 3 of Schedule PMA-4, indicating similar, but slightly greater relative financial risk which exacerbates CWS's greater relative business risk based upon its smaller relative size vis-à-vis the two proxy groups.

VI. CAROLINA WATER SERVICE, INC.

Q. Have you reviewed the rate filing?

A. Yes. CWS is a wholly-owned subsidiary of Utilities, Inc. and provides water and sewer service to 5,733 (water) and 9,779 (sewer) customers throughout South Carolina, from Charleston to Columbia.

VII. PROXY GROUPS

Q. Please explain how you chose the proxy group of six water companies.

A. The basis of selection for the proxy group of six AUS Utility Reports water companies were those companies that meet the following criteria: 1) they are included in the Water Company Group of AUS Utility Reports (March 2005); 2) they have Value Line or Thomson FN/First Call Consensus; and 3) they have more than 70% of their 2003 operating revenues derived from water and sewer operations. Six companies met all of these criteria.

Q. Please describe Schedule PMA-3.

A. Schedule PMA-3 contains comparative capitalization and financial statistics for the six AUS Utility Reports water companies for the years 1999 through 2003. The schedule consists of three pages. Page 1 contains a summary of the comparative data for the years 1999-2003. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group. Page 3 contains the capital structure ratios based upon total capital (including short-term debt) by company and on average for the years 1999-2003.

During the five-year period ending 2003, the historically achieved average earnings rate on book common equity for this group ranged between 8.97% in 2003, and 10.82% in 1999, and averaged 10.16%. The five-year average market/book ratio ending 2003 was 212.98%. The five-year ending 2003 average common equity ratio based upon total investor-provided capital was 43.09%, while the five-year average dividend payout ratio was 80.17%.

Coverage of interest charges, excluding all AFUDC from funds from operations for the years 1999-2003 ranged between 3.10 and 3.38 times and averaged 3.26 times during the five-year period, while funds from operations relative to total debt ranged from 13.57% to 15.57% and averaged 14.36% for the five-year period.

Q. Please explain how you chose the proxy group of three Value Line water companies.

A. The basis of selection for the proxy group of three Value Line (Standard Edition) water companies was to include those companies which are part of Value Line's (Standard Edition) Water Utility Industry Group.

Q. Please describe Schedule PMA-4.

A. Schedule PMA-4 contains comparative capitalization and financial statistics for the three Value Line (Standard Edition) water companies for the years 1999 through 2003. The schedule consists of three pages. Page 1 contains a summary of the comparative data for the years 1999-2003. Page 2 contains notes relevant to page 1, as well as the basis of selection and names of the individual companies in the proxy group. Page 3 contains the capital structure ratios based upon total capital (including short-term debt) by company and on average for the years 1999-2003.

During the five-year period ending 2003, the historically achieved average earnings rate on book common equity for this group ranged between 8.86% in 2003, and 11.37% in 2000, and averaged 10.60%. The five-year average market/book ratio ending 2003 was 219.34%. The five-year ending 2003 average common equity ratio based upon total investor-provided capital was 43.01%, while the five-year average dividend payout ratio was 75.16%.

Coverage of interest charges, excluding all AFUDC from funds from operations for the years 1999-2003 ranged between 3.40 and 3.63 times and averaged 3.54 times during the five-year period, while funds from operations relative to total debt ranged from 14.60% to 18.17% and averaged 15.89% during the five-year period.

VIII. COMMON EQUITY COST RATE MODELS

A. The Efficient Market Hypothesis (EMH)

Q. Are the cost of common equity models you use market-based models, and hence based upon the EMH?

A. Yes. The DCF model is market-based in that market prices are utilized in developing the dividend yield component of the model. The RPM is market-based in that the bond ratings and expected bond yields used in the application of the RPM reflect the market's assessment of risk. In addition, the use of betas to determine the equity risk premium also reflects the market's assessment of risk as betas are derived from regression analyses of market prices. The CAPM is market-based for many of the same reasons that the RPM is market-based i.e., the use of expected bond (Treasury bond) yields and betas. The CEM is market-based in that the process of selecting the comparable risk non-utility companies is based upon statistics which result from regression analyses of market prices. Therefore, all the cost of common equity models I utilize are market-based models, and hence based upon the EMH.

Q. Please describe the conceptual basis of the EMH.

A. The Efficient Market Hypothesis (EMH), which is the foundation of modern investment theory, was pioneered by Eugene F. Fama[7] in 1970. An efficient market is one in which security prices reflect all relevant information all the time. This implies that prices adjust instantaneously to new information, thus reflecting the intrinsic fundamental economic value of a security.[8]

The essential components of the EMH are:

A. Investors are rational and invest in assets providing the highest expected return given a particular level of risk.

B. Current market prices reflect all publicly available information.

C. Returns are independent i.e., today's market returns are unrelated to yesterday's returns.

D. Capital markets follow a random walk i.e., the probability distribution of expected returns approximates a normal distribution.

Brealey and Myers state:[9]

> When economists say that the security market is 'efficient', they are not talking about whether the filing is up to date or whether desktops are tidy. They mean that information is widely and cheaply available to investors and that all relevant and ascertainable information is already reflected in security prices.
>
> The three forms of the EMH are:
>
> A. The "weak" form which asserts that all past market prices and data are fully reflected in securities prices i.e., technical analysis cannot enable an investor to "outperform the market".
>
> B. The "semistrong" form which asserts that all publicly available information

[7] Fama, Eugene F., "Efficient Capital Markets: A Review of Theory and Empirical Work". Journal of Finance, May 1970, pp. 383-417.

[8] Morin, Roger A., Regulatory Finance - Utilities' Cost of Capital. Public Utility Reports, Inc., Arlington, VA, 1994, p. 136.

[9] Brealey, R.A. and Myers, S.C., Principles of Corporate Finance, McGraw-Hill Publications, Inc., 1996, pp. 323-324.

is fully reflected in securities prices i.e., fundamental analysis cannot enable an investor to "outperform the market".

C. The "strong" form which asserts that all information, both public and private, is fully reflected in securities prices i.e., even insider information cannot enable an investor to "outperform the market".

The "semistrong" form of the EMH is generally held to be true because the use of insider information often enables investors to "outperform the market" and earn excessive returns. The generally-accepted "semistrong" form of the EMH means that all perceived risks are taken into account by investors in the prices they pay for securities. Investors are aware of all publicly-available information, including bond ratings, discussions about companies by bond rating agencies and investment analysts as well as the various cost of common equity methodologies (models) discussed in the financial literature. In an attempt to emulate investor behavior, this means that no single common equity cost rate model should be relied upon in determining a cost rate of common equity and that the results of multiple cost of common equity models should be taken into account.

Q. Is there support in the academic literature for the need to rely upon more than one cost of common equity model in arriving at a recommended common equity cost rate?

A. Yes. For example, Phillips[10] states:

> Since regulation establishes a level of authorized earnings which, in turn, implicitly influences dividends per share, *estimation of the growth rate from such data is an inherently circular process. For these reasons, the DCF model "suggests a degree of precision which is in fact not present" and leaves "wide room for controversy and argument about the level of k" [investors' capitalization or discount (i.e., the cost*

[10] Charles F. Phillips, Jr., The Regulation of Public Utilities-Theory and Practice, 1993, Public Utility Reports, Inc., Arlington, VA, p. 396, 398.

of capital)]. (italics added) (p. 396)

* * *

Despite the difficulty of measuring relative risk, the comparable earnings standard is no harder to apply than is the market-determined standard. The DCF method, to illustrate, requires a subjective determination of the growth rate the market is contemplating. Moreover, as Leventhal has argued: *'Unless the utility is permitted to earn a return comparable to that available elsewhere on similar risk, it will not be able in the long run to attract capital.'* (italics added) (p. 398)

Also, Morin[11] states:

Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the CAPM and other risk premium methods. The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity. *It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings does not make it superior to other methods.* (italics added) (Morin, pp. 231-232)

Each methodology requires the exercise of considerable judgment on the reasonableness of the assumptions underlying the methodology and on the reasonableness of the proxies used to validate a theory. *The failure of the traditional infinite growth DCF model to account for changes in relative market valuation, discussed above, is a vivid example of the potential shortcomings of the DCF model when applied to a given company. It follows that more than one methodology should be employed in arriving at a judgment on the cost of equity and that these methodologies should be applied across a series of comparable risk companies. ...Financial literature supports the use of multiple methods.* (italics added) (Morin, p. 239)

Professor Eugene Brigham, a widely respected scholar and finance academician asserted:

In practical work, it is often best to use all three methods -CAPM, bond yield plus risk premium, and DCF - and then apply judgement when the methods produce different results. People experienced in estimating capital costs recognize that both careful analysis and very

[11] Roger A. Morin, Regulatory Finance-Utilities' Cost of Capital, 1994, Public Utilities Reports, Inc., Arlington, VA, pp. 231-232, 239-240.

> fine judgements are required. It would be nice to pretend that these judgements are unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible. (italics added) (Morin, pp. 239-240)

Another prominent finance scholar, Professor Stewart Myers, in his best-selling corporate finance textbook stated:

> *The constant growth formula and the capital asset pricing model are two different ways of getting a handle on the same problem.* (italics added) (Morin, p. 240)

In an earlier article, Professor Myers explained the point more fully:

> Use more than one model when you can. Because estimating the opportunity cost of capital is difficult, only a fool throws away useful information. That means you should not use any one model or measure mechanically and exclusively. Beta is helpful as one tool in a kit, to be used in parallel with DCF models or other techniques for interpreting capital market data. (Morin, p. 240)

In view of the foregoing, it is clear that investors are aware of all of the models available for use in determining a common equity cost rate. The EMH requires the assumption that, collectively, investors use them all.

B. Discounted Cash Flow Model (DCF)

1. Theoretical Basis

Q. What is the theoretical basis of the DCF model?

A. The theory of the DCF model is that the present value of an expected future stream of net cash flows during the investment holding period can be determined by discounting the cash flows at the cost of capital, or the capitalization rate. DCF theory suggests that an investor buys a stock for an expected total return rate which is expected to be derived from cash flows received in the form of dividends plus appreciation in market price (the expected growth rate). Thus, the dividend yield on market price plus a growth rate equals the capitalization rate, i.e., the total return rate expected by investors.

Q. Please comment on the applicability of the DCF model in establishing a cost of common equity for CWS.

A. The extent to which the DCF is relied upon should depend upon the extent to which the cost rate results differ from those resulting from the use of other cost of common equity models because the DCF model has a tendency to mis-specify investors' required return rate when the market value of common stock differs significantly from its book value. Market values and book values of common stocks are seldom at unity. The market-based DCF model will result in a total annual dollar return on book common equity equal to the total annual dollar return expected by investors only when market and book values are equal, a rare and unlikely situation. In recent years, the market values of utilities' common stocks have been well in excess of their book values as shown on page 1 of Schedule PMA-3 ranging between 191.35% and 221.41% for the proxy group of six AUS Utility Reports water companies and between 206.93% and 225.26% for the proxy group of three Value Line (Std. Ed.) water companies as shown on page 1 of Schedule PMA-4.

Mathematically, the DCF model understates/overstates investors' required return rate when market value exceeds/is less than book value because, in many instances, market prices reflect investors' assessments of long-range market price growth potentials (consistent with the infinite investment horizon implicit in the standard regulatory version of the DCF model) not fully reflected in analysts' shorter range forecasts of future growth for earnings per share (EPS) and dividends per share (DPS) accounting proxies. This indicates the need to better match market prices with investors' longer range growth expectations embedded in those prices. However, the understatement/overstatement of investors' required return rate associated with the application of the market price-based DCF model to the book value of common equity clearly illustrates why reliance upon a single common equity cost rate model should be avoided.

2. Applicability of a Market-Based Common Equity <u>Cost Rate to a Book Value Rate Base</u>

Q. Is it reasonable to expect the market values of utilities' common stocks to continue to sell well above their book values?

A. Yes. I believe that the common stocks of utilities will continue to sell substantially above their book values, because many investors, especially individuals who traditionally committed less capital to the equity markets, will likely continue to commit a greater percentage of their available capital to common stocks in view of lower interest rate alternative investment opportunities and to provide for retirement. The recent past and current capital market environment is in stark contrast to the late 1970's and early 1980's when very high (by historical standards) yields on secured debt instruments in public utilities were available. Despite the fact that the market declined significantly during late 2001 through 2003, following the September 11, 2001 tragedy, utility stocks have continued to sell at market prices well above their book values. The significant recent increases in market-to-book ratios have been influenced by factors other than fundamentals such as actual and reported growth in earnings per share (EPS) and dividends per share (DPS).

Traditional rate base/rate of return regulation, where a market-based common equity cost rate is applied to a book value rate base, presumes that market-to-book ratios are one. However, there is ample empirical evidence over sustained periods which demonstrate that this is an incorrect presumption. Market-to-book ratios of one are rarely the case as there are many factors affecting the market price of common stocks, in addition to earnings. Moreover, allowed ROEs have a limited effect on utilities' market/book ratios as market prices of common stocks are influenced by a number of other factors beyond the direct influence of the regulatory process.

For example, Phillips[12] states:

> Many question the assumption that market price should equal book value, believing that 'the earnings of utilities should be sufficiently high to achieve market-to-book ratios which are consistent with those prevailing for stocks of unregulated companies.'

In addition, Bonbright[13] states:

> In the first place, commissions cannot forecast, except within wide limits, the effect their rate orders will have on the market prices of the stocks of the companies they regulate. In the second place, *whatever the initial market prices may be, they are sure to change not only with the changing prospects for earnings, but with the changing outlook of an inherently volatile stock market.* In short, market prices are beyond the control, though not beyond the influence of rate regulation. Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)

In view of the foregoing, a mismatch results in the application of the DCF model as market prices reflect long range expectations of growth in market prices (consistent with the presumed infinite investment horizon of the standard DCF model), while the short range forecasts of growth in accounting proxies, i.e., EPS

[12] Id., at p. 395.

[13] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates, 1988, Public Utilities Reports, Inc., Arlington, VA, p. 334.

and DPS, do not reflect the full measure of growth (market price appreciation) expected in per share market value.

Q. Please explain why a DCF-derived common equity cost rate mis-specifies investors' expected common equity cost rate when the market/book ratio is greater or less than unity (100%).

A. Under the DCF model, the rate of return investors require is related to the price paid for a stock i.e., market price is the basis upon which they formulate the required rate of return. A regulated utility is limited to earning on its net book value (depreciated original cost) rate base. As discussed previously, market values differ from book values for many reasons unrelated to earnings. Thus, when market values differ significantly from book values, a market-based DCF cost rate applied to the book value of common equity will not accurately reflect investors' expected common equity cost rate. It will either overstate or understate investors' expected common equity cost rate (without regard to any adjustment for flotation costs which may, at times, be appropriate on an ad hoc basis) depending upon whether market value is less than or greater than book value.

Schedule PMA-5 demonstrates how a market-based DCF cost rate applied to a book value which is either below or above market value will either understate or overstate investors' expectations because these expectations are based on a required return on market value. As shown, there is no realistic opportunity to earn the market-based rate of return on book value. Note that in Column 1, investors expect a 10.50% return on a market price of $24.00. Moreover, as shown in Column 2, when the 10.50% return rate on market value is applied to book value which is approximately 55.5% of market value, the total annual return opportunity is just $1.400 on book value. With an annual dividend of $0.840, there is an opportunity for growth of $0.560 which translates to just 2.33% in contrast to the 7.00% growth in market price expected by investors. There is no way to possibly achieve the expected growth of $1.680 or 7.00% absent a huge cut in the annual dividend, an unreasonable expectation which would result in an extremely adverse reaction by investors because it would be a sign of extreme financial distress.

Conversely, in Column 3, where the market-to-book ratio is 80%, when the 10.50% return rate on market value is applied to a book value which is approximately 25.0% greater than market value, the total annual return opportunity is $3.150 on book value with an annual dividend of $0.840, there is an opportunity for growth of $2.310 which translates to 9.63% in contrast to the 7.00% growth in market price expected by investors.

In view of the foregoing, it is clear that the DCF model either understates or overstates investors' required cost of common equity capital when market values exceed or are less than their underlying book values and thus multiple cost of common equity models should be relied upon when estimating investors' expectations.

Q. Have any commissions explicitly stated that the DCF model should not be relied upon exclusively?

A. Yes. As stated previously, the majority of regulatory commissions rely upon a combination of the various cost of common equity models available.

Specifically, the Iowa Utilities Board (IUB) has recognized the tendency of the DCF model to understate investors' expected cost of common equity capital when market values are significantly above their book values. In its June 17, 1994 Final Decision and Order in Re U.S. West Communications, Docket No. RPU-93-9 the IUB stated:[14]

> While the Board has relied in the past on the DCF model, in *Iowa Electric Light and Power Company*, Docket No. RPU-89-9, "Final Decision and Order" (October 15, 1990), the Board stated: '[T]he DCF model may understate the return on equity in some circumstances. This is particularly true when the market is relatively volatile and the company in question has a market-to-book ratio in excess of one." Those conditions exist in this case and the Board will not rely on the DCF return. (Consumer Advocate Ex. 367, See Tr. 2208, 2250, 2277, 2283-2284). *The DCF approach underestimates the cost of equity needed to assure capital attraction during this time of market uncertainty and volatility. The board will, therefore, give preference to the risk premium approach.* (italics added)

Similarly, in 1994, the Indiana Utility Regulatory Commission (IURC), for example, recognized the tendency of the DCF model to understate the cost of equity when market value exceeds book value[15]:

> In determining a common equity cost rate, we must again recognize the tendency of the traditional DCF model, . . . to understate the cost of common equity. As the Commission stated in Indiana-Mich. Power Co. (BPU 8/24/90), Cause No. 38728, 116 PUR 4th 1, 17-18, *"the unadjusted DCF result is almost always well below what any informed financial analyst would regard as defensible, and therefore, requires an upward adjustment based largely on the expert witness's judgement."* (italics added)
>
> * * *
>
> [u]nder the traditional DCF model . . . the appropriate earnings level of the utility would not be derived by applying the DCF result to the market price of the Company's stock . . . it would be applied to the utility's net original cost rate base. *If the market price of the stock exceeds its book value, . . . the investor will not achieve the*

[14] Re: U.S. West Communications, Inc., Docket No. RPU-93-9, 152 PUR4th at 459.

[15] Re: Indiana-American Water Company, Inc., Cause No. 39595, 150 PUR4th at 167-168.

return which the model finds is necessary. (italics added)

Also, the Hawaii Public Utilities Commission (HPUC) recognized this phenomenon in a decision dated June 30, 1992[16] in a case regarding Hawaiian Electric Company, Inc., when it stated:

> In this docket, as in other rate proceedings, experts disagree on the relative merits of the various methods of determining the cost of common equity. In this docket, HECO is particularly critical of the use of the constant growth DCF methodology. It asserts that method is imbued with downward bias and, thus, its use will understate common equity cost. *We are cognizant of the shortcomings of the DCF method.* There are, however, shortcomings to be found with the use of CAPM and the RP methods as well. We reiterate that, despite the problems with the use of any methodology, *all methods should be considered and that the DCF method and the combined CAPM and RP methods should be given equal weight.* (italics added)

Q. Do other cost of common equity models contain unrealistic assumptions and have shortcomings?

A. Yes. That is why I am not recommending that any of the models be relied upon exclusively. I have focused on the shortcomings of the DCF model because some regulatory commissions still place excessive or exclusive reliance upon it. Although the DCF model is useful, it is not a superior methodology that supplants financial theory and market evidence based upon other valid cost of common equity models. For these reasons, no model, including the DCF, should be relied upon exclusively.

[16] Re: Hawaiian Electric Company, Inc., Docket No. 6998, 134 PUR4th at 479.

3. Application of the Single-Stage DCF Model

a. Dividend Yield

Q. Please describe the dividend yield you used in your application of the DCF model.

A. The unadjusted dividend yields are based upon an average of a recent spot date (March 28, 2005) as well as an average of the three months ended February 28, 2005, respectively, which are shown on Schedule PMA-7. The average unadjusted yield is 3.2% for the six AUS Utility Reports water companies and 3.0% for the three Value Line (Std. Ed.) water companies.

b. Discrete Adjustment of Dividend Yield

Q. Please explain the dividend growth component shown on Schedule PMA-6, pages 1 and 2, Column 2.

A. Because dividends are paid quarterly, or periodically, as opposed to continuously (daily), an adjustment to the dividend yield must be made. This is often referred to as the discrete, or the Gordon Periodic, version of the DCF model.

Since the various companies in the proxy group increase their quarterly dividend at various times during the year, a reasonable assumption is to reflect one-half the annual dividend growth rate in the D_1 expression, or $D_{1/2}$. This is a conservative approach which does not overstate the dividend yield which should be representative of the next twelve-month period. Therefore, the actual average dividend yields in Column 1 on Schedule PMA-6 have been adjusted upward to reflect one-half the growth rates shown in Column 4.

c. Selection of Growth Rates for Use in the Single-Stage DCF Model

Q. Please explain the basis of the growth rates of the proxy group of six AUS Utility Reports water companies and the proxy group of three Value Line (Std. Ed.) water companies which you use in your application of the DCF model.

A. Schedule PMA-8 indicates that 79.5% of the common shares of the proxy group of six AUS Utility Reports water companies and 70.3% of the common shares of the proxy group of three Value Line (Std. Ed.) water companies are held by individuals as opposed to institutional investors. Individual investors are particularly likely to place great significance on the opinions expressed by financial information services, such as Value Line and Thomson FN/First Call, which are easily accessible and/or available on the Internet.

Forecasts by analysts, including Value Line, are typically limited to five years. In my opinion, I believe that investors in water utilities would have little interest in historical growth rates beyond the most recent five years because an historical five-year period balances the five-year period for projected growth rates. Consequently, the use of five-year historical and five-year projected growth rates in earnings per share (EPS) and dividends per share (DPS) as well as the sum of internal and external growth in per share value (BR + SV) is appropriate to consider in the determination of a growth rate for use in this application of the DCF model. In addition, investors realize that analysts have significant insight into the dynamics of the industries and they analyze individual companies as well as companies' abilities to effectively manage the effects of changing laws and regulations. Consequently, I have reviewed analysts' projected growth in EPS, as well as historical and projected five-year compound growth rates in EPS, DPS and (BR + SV) for each company in each proxy group.

The historical growth rates are from Value Line or are calculated in a manner similar to Value Line, while the projected growth rates in earnings are from Value Line and Thomson FN/First Call forecasts. Thomson FN/First Call growth rate estimates are not available for DPS and internal growth, and they do not include the Value Line projections.

In addition to evaluating EPS and DPS growth rates, it is reasonable to assume that investors also assess (BR + SV). The concept is based on well documented financial theory that future dividend growth is a function of the portion of the overall return to investors which is reinvested in the firm plus the sales of new common stock. Consequently, the growth component as proxied by internal and external growth is defined as follows:

$$g = BR + SV$$

Where:

B = the fraction of earnings retained by the firm, i.e., retention ratio

R = the return on common equity

S = the growth in common shares outstanding

V = the premium/discount of a company's stock price relative to its book value, i.e., one minus the complement of the market/book ratio.

Consistent with the use of five-year historical and five-year projected growth rates in EPS and DPS, I have derived five-year historical and five-year projected (BR + SV) growth. Projected EPS growth rate averages are shown in Column 4 on the lower half of Schedule PMA-6, while historical and projected growth in DPS, EPS, and BR + SV is shown in Column 4 on the upper half of Schedule PMA-6. The bases of these growth rates are summarized for the companies in each proxy group on page 1, Schedule PMA-9. Supporting growth rate data are detailed on pages 2 through 9 of Schedule PMA-9, while pages 8 through 12 contain all of the most current Value Line Investment Survey data for the companies in both proxy groups.

d. Conclusion of Single-Stage Cost Rates

Q. Please summarize the single-stage growth DCF model results.

A. As shown on Schedule PMA-6, the results of the applications of the single-stage DCF model are 10.6% for the proxy group of six AUS Utility Reports water companies and 10.8% for the proxy group of three Value Line (Std. Ed.) water companies. In arriving at conclusions of indicated common equity cost rates for the two proxy groups, I included only those single-stage DCF results which are greater than 200 basis points above the average prospective yield on Moody's A rated public utility bonds of 6.6%, or 8.6%, based upon Blue Chip Financial Forecasts' April 1, 2005 consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds as discussed subsequently and derived in Note 3 on page 6 of Schedule PMA-10. It is necessary to adjust the average Aaa rated corporate bond yield to be equivalent to a Moody's A2 rated public utility bond. As detailed in Note 2 on page 1 of Schedule PMA-10, an adjustment to the average prospective yield on Aaa rated corporate bonds of 0.4% was required. Thus, the average prospective yield on Moody's A rated public utility bonds is 6.6%.

Based upon a review of recent authorized returns on common equity (ROE) vis-à-vis concurrent estimates of the forecasted average yield on A rated public utility bonds, I determined that the equity risk premium implicit in recent PSC SC authorized ROEs is between 216 and 507 basis points. In addition, the PSC SC's authorized common equity cost rate for South Carolina Electric and Gas in Docket Nos. 2002-223-E and 0-2003-38 of 12.45% entered January 31, 2003 was 504 basis points above the then prospective yield on A rated public utility bonds of 7.41%. In accordance with the EMH, investors are aware of these implicit equity risk premia and, in my opinion, would not consider returns providing an equity risk premium of only 200 basis points either reasonable or credible. Therefore, it is reasonable, if not conservative, to eliminate any single-stage DCF results which are no more than 200 basis points above the current prospective average yield on A rated public utility bonds of 6.6%.

4. <u>Conclusion of DCF Cost Rates</u>

Q. Please summarize the DCF model results.

A. As shown on Schedule PMA-6, the results of the applications of the DCF model are 10.6% for the proxy group of six AUS Utility Reports water companies and 10.8% for the proxy group of three Value Line (Std. Ed.) water companies.

C. <u>The Risk Premium Model (RPM)</u>

1. <u>Theoretical Basis</u>

Q. Please describe the theoretical basis of the RPM.

A. Risk Premium theory indicates that the cost of common equity capital is greater than the prospective company-specific cost rate for long-term debt capital. In other words, the cost of common equity equals the expected cost rate for long-term debt capital plus a risk premium to compensate common shareholders for the added risk of being unsecured and last-in-line for any claim on the corporation's assets and earnings.

Q. Some analysts state that the RPM is another form of the CAPM. Do you agree?

A. While there are some similarities, there is a very significant distinction between the two models. The RPM and CAPM both add a "risk premium" to an interest rate. However, the beta approach to the determination of an equity risk premium in the RPM should not be confused with the CAPM. Beta is a measure of systematic, or market, risk, a relatively small percentage of total risk (the sum of both non-diversifiable systematic and diversifiable unsystematic risk). Unsystematic risk is fully captured in the RPM through the use of the prospective long-term bond yield as can be shown by reference to pages 3 through 9 of Schedule PMA-2, which confirm that the bond rating process involves an assessment of all business and financial risks. In contrast, the use of a risk-free rate of return in the CAPM does not, and by definition cannot, reflect a company's specific i.e., unsystematic risk. Consequently, a much larger portion of the total common equity cost rate is reflected in the company-specific bond yield (a product of the bond rating) than is reflected in the risk-free rate in the CAPM, or indeed even by the dividend yield employed in the DCF model. Moreover, the financial literature recognizes the RPM and CAPM as two separate and distinct cost of common equity models as discussed previously.

Q. Have you performed RPM analyses of common equity cost rate for the two proxy groups?

A. Yes. The results of my application of the RPM are summarized on page 1 of Schedule PMA-10. On Line No. 3, page 1, Schedule PMA-10, I show the average expected yield on A rated public utility bonds of 6.6%. On Line No. 4, I show the adjustments, if necessary, that need to be made to the average 6.6% expected A rated utility bond yield so that the expected yields of 6.6% in Line No.

5 is reflective of the average Moody's bond rating of A2 for both the proxy group of six AUS Utility Reports water companies and the three Value Line (Std. Ed.) water companies. On Line No. 6 of page 1, my conclusions of an equity risk premium applicable to each proxy group are shown, while the total risk premium common equity cost rates are shown on Line No. 7.

2. Estimation of Expected Bond Yield

Q. Please explain the basis of the expected bond yield of 6.6% applicable to the average company in both proxy groups.

A. Because the cost of common equity is prospective, a prospective yield on similarly-rated long-term debt is essential. As shown on Schedule PMA-10, page 2, the average Moody's bond rating of both proxy groups is A2. I relied upon a consensus forecast of about 50 economists of the expected yield on Aaa rated corporate bonds for the six calendar quarters ending with the third calendar quarter of 2006 as derived from the April 1, 2005 Blue Chip Financial Forecasts (shown on page 7 of Schedule PMA-10). As shown on Line No. 1 of page 1 of Schedule PMA-10, the average expected yield on Moody's Aaa rated corporate bonds is 6.2%. It is necessary to adjust that average yield to be equivalent to a Moody's A2 rated public utility bond. Consequently, an adjustment to the average prospective yield on Aaa rated corporate bonds of 0.4% was required. It is shown on Line No. 2, page 1 of Schedule PMA-10 and explained in Note 2 at the bottom of the page. After adjustment, the expected bond yield applicable to a Moody's A rated public utility bond is 6.6% as shown on Line No. 3, page 1 of Schedule PMA-10.

Because both the proxy group of six AUS Utility Reports water companies' and the proxy group of three Value Line (Std. Ed.) water companies' average Moody's bond rating is A2, no adjustment is necessary to make the prospective bond yield applicable to an A2 public utility bond. Therefore, the expected specific bond yield is 6.6% for both proxy groups of water companies.

3. Estimation of the Equity Risk Premium

Q. Please explain the method utilized to estimate the equity risk premium.

A. I evaluated the results of two different historical equity risk premium studies, as well as Value Line's forecasted total annual market return in excess of the prospective yield on high grade corporate bonds, as detailed on pages 5, 6 and 8 of Schedule PMA-10. As shown on Line No. 3, page 5 of Schedule PMA-10, the mean equity risk premium based on both of the studies is 4.0% applicable to the proxy group of six AUS Utility Reports water companies and 4.2% applicable to the proxy group of three Value Line (Std. Ed.) water companies. These estimates are the result of an average of a beta-derived historical equity risk premium and a forecasted total market equity risk premium as well as the mean historical equity risk premium applicable to public utilities with bonds rated A based upon holding period returns.

The basis of the beta-derived equity risk premia applicable to the proxy groups is shown on page 6 of Schedule PMA-10. Beta-determined equity risk premia should receive substantial weight because betas are derived from the market prices of common stocks over a recent five-year period. Beta is a meaningful measure of prospective relative risk to the market as a whole and is a logical means by which to allocate a relative share of the market's total equity risk premium.

The total market equity risk premium utilized is 5.6% and is based upon an average of both the long-term historical and forecasted market risk premia of

6.3% and 4.8%, respectively, as shown on page 6 of Schedule PMA-10. To derive the historical market equity risk premium, I used the most recent Ibbotson Associates' data on holding period returns for the S&P 500 Composite Index and the average historical yield on Moody's Aaa and A rated corporate bonds for the period 1926-2004. The use of holding period returns over a very long period of time is useful in the beta approach. As Ibbotson Associates'[17] Valuation Edition 2005 Yearbook states:

> The estimate of the equity risk premium depends on the length of the data series studied. A proper estimate of the equity risk premium requires a data series long enough to give a reliable average without being unduly influenced by very good and very poor short-term returns. When calculated using a long data series, the historical equity risk premium is relatively stable.[5] Furthermore, because an average of the realized equity risk premium is quite volatile when calculated using a short history, using a long series makes it less likely that the analyst can justify any number he or she wants. The magnitude of how shorter periods can affect the result will be explored later in this chapter.
>
> Some analysts estimate the expected equity risk premium using a shorter, more recent time period on the basis that recent events are more likely to be repeated in the near future; furthermore, they believe that the 1920s, 1930s and 1940s contain too many unusual events. This view is suspect because all periods contain "unusual" events. Some of the most unusual events this century took place quite recently, including the inflation of the late 1970s and early 1980s, the October 1987 stock market crash, the collapse of the high-yield bond market, the major contraction and consolidation of the thrift industry, the collapse of the Soviet Union, and the development of the European Economic Community – all of these happened in the last 30 years.
>
> It is even difficult for economists to predict the economic environment of the future. For example, if one were analyzing the stock market in 1987 before the crash, it would be statistically improbable to predict the impending short-term volatility without considering the stock market crash and market volatility of the

[17] Ibbotson Associates, Stocks, Bonds, Bills and Inflation – Valuation Edition 2005 Yearbook, pp. 80-81.

1929-1931 period.

> Without an appreciation of the 1920s and 1930s, no one would believe that such events could happen. The 79-year period starting with 1926 is representative of what can happen: it includes high and low returns, volatile and quiet markets, war and peace, inflation and deflation, and prosperity and depression. Restricting attention to a shorter historical period underestimates the amount of change that could occur in a long future period. Finally, because historical event-types (not specific events) tend to repeat themselves, long-run capital market return studies can reveal a great deal about the future. Investors probably expect "unusual" events to occur from time to time, and their return expectations reflect this. (footnote omitted)

In addition, the use of long-term data in a RPM model is consistent with the long-term investment horizon presumed by the DCF model. Consequently, the long-term arithmetic mean total return rates on the market as a whole of 12.4% and the long-term arithmetic mean yield on corporate bonds of 6.1% were used, as shown at Line Nos. 1 and 2 of page 6 of Schedule PMA-10. As shown on Line No. 3 of page 6, the resultant long-term historical equity risk premium on the market as a whole is 6.3%.

I used arithmetic mean return rates because they are appropriate for cost of capital purposes. As Ibbotson Associates state in their Valuation Edition 2005 Yearbook[18]:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric

[18] Id., p. 75.

> average is more appropriate for reporting past performance, since it represents the compound average return.
>
> The argument for using the arithmetic average is quite straightforward. In looking at projected cash flows, the equity risk premium that should be employed is the equity risk premium that is expected to actually be incurred over the future time periods. Graph 5-3 shows the realized equity risk premium for each year based on the returns of the S&P 500 and the income return on long-term government bonds. (The actual, observed difference between the return on the stock market and the riskless rate is known as the realized equity risk premium.) There is considerable volatility in the year-by-year statistics. At times the realized equity risk premium is even negative.

As Ibbotson Associates[19] states in their 1999 Yearbook:

> The expected equity risk premium should always be calculated using the arithmetic mean. The arithmetic mean is the rate of return which, when compounded over multiple periods, gives the mean of the probability distribution of ending wealth values....Stated another way, the arithmetic mean is correct because an investment with uncertain returns will have a higher expected ending wealth value than an investment which earns, with certainty, its compound or geometric rate of return every year.... *Therefore, in the investment markets, where returns are described by a probability distribution, the arithmetic mean is the measure that accounts for uncertainty, and is the appropriate one for estimating discount rates and the cost of capital.* (italics added)

Ex-post (historical) total returns and equity risk premium spreads differ in size and direction over time. This is precisely why the arithmetic mean is important as it provides insight into the variance and standard deviation of returns. This prospect for variance, as captured in the arithmetic mean, provides the valuable insight needed by investors to estimate future risk when making a current investment. Absent such valuable insight into the potential variance of returns, investors cannot meaningfully evaluate prospective risk. As discussed previously, all of the cost of common equity models, including the DCF, are

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19 Ibbotson Associates, Stocks, Bonds, Bills and Inflation - 1999 Yearbook, pp. 157-158.

premised upon the EMH, that all publicly available information is reflected in the market prices paid. If investors relied upon the geometric mean of ex-post spreads, they would have no insight into the potential variance of future returns because the geometric mean relates the change over many periods to a constant rate of change, thereby obviating the year-to-year fluctuations, or variance, *critical to risk analysis*.

The basis of the forecasted market equity risk premium can be found on Line Nos. 4 through 6 on page 6 of Schedule PMA-10. It is derived from an average of the most recent 3-month (using the months of January 2005 through March 2005) and a recent spot (March 25, 2005) median market price appreciation potentials by Value Line as explained in detail in Note 1 on page 3 of Schedule PMA-11. The average expected price appreciation is 43% which translates to 9.35% per annum and, when added to the average (similarly calculated) dividend yield of 1.60% equates to a forecasted annual total return rate on the market as a whole of 10.95%, rounded to 11.0%. Thus, this methodology is consistent with the use of the 3-month and spot dividend yields in my application of the DCF model. To derive the forecasted total market equity risk premium of 4.8% shown on Schedule PMA-10, page 6, Line No. 6, the April 1, 2005 forecast of about 50 economists of the expected yield on Moody's Aaa rated corporate bonds for the six calendar quarters ending with the third calendar quarter 2006 of 6.2% from Blue Chip Financial Forecasts was deducted from the Value Line total market return of 11.0%. The calculation results in an expected market risk premium of 4.8%.

The average of the historical and projected market equity risk premia of 6.3% and 4.8% is 5.55%, rounded to 5.6%.

On page 9 of Schedule PMA-10, the most current Value Line (Standard Edition) betas for the companies in the two proxy groups are shown. Applying the average beta of each proxy group to the average market equity risk premium of 5.6% results in a beta adjusted equity risk premium of 3.8% for the proxy group of six AUS Utility Reports water companies and 4.1% for the proxy group of three Value Line (Std. Ed.) water companies as shown on Schedule PMA-10, page 6, Line No. 9.

A mean equity risk premium of 4.2% applicable to companies with A rated public utility bonds was calculated based upon holding period returns from a study using public utilities, as shown on Line No. 2, page 5 of Schedule PMA-10, and detailed on page 8 of the same schedule.

The equity risk premia applicable to the proxy group of six AUS Utility Reports water companies and the proxy group of three Value Line (Std. Ed.) water companies are the averages of the beta-derived premia and that based upon the holding period returns of public utilities with A rated bonds, as summarized on Schedule PMA-10, page 5, i.e., 4.0% and 4.2%.

Q. What are the RPM calculated common equity cost rates?

A. They are 10.6% for the six AUS Utility Reports water companies and 10.8% for the three Value Line (Std. Ed.) water companies as shown on Schedule PMA-10, page 1.

Q. Some critics of the RPM model claim that its weakness is that it presumes a constant equity risk premium. Is such a claim valid?

A. No. The equity risk premium varies inversely with interest rate changes, although not in tandem with those changes. This presumption of a constant equity risk premium is no different than the presumption of a constant "g", or growth component, in the DCF model. If one calculates a DCF cost rate today, the absolute result "k", as well as the growth component "g", would invariably differ from a calculation made just one or several months earlier. This implies that the "g" does change, although in the application of the standard DCF model, the "g" is presumed to be constant. Hence, there is no difference between the RPM and DCF models in that both models assume a constant component, but in reality, these components, the "g" and the equity risk premium both change.

As Morin[20] states with respect to the DCF model:

> It is not necessary that *g* be constant year after year to make the model valid. *The growth rate may vary randomly around some average expected value. Random variations around trend are perfectly acceptable, as long as the mean expected growth is constant.* The growth rate must be 'expectationally constant' to use formal statistical jargon. (italics added)

The foregoing confirms that the RPM is similar to the DCF model. Both assume an "expectationally constant" risk premium and growth rate, respectively, but in reality both vary (change) randomly around an arithmetic mean. Consequently, the use of the arithmetic mean, and not the geometric mean is confirmed as appropriate in the determination of an equity risk premium as discussed previously.

D. <u>The Capital Asset Pricing Model (CAPM)</u>

1. <u>Theoretical Basis</u>

Q. Please explain the theoretical basis of the CAPM.

A. CAPM theory defines risk as the covariability of a security's returns with the

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[20] Id., p. 111.

market's returns. This covariability is measured by beta ("β"), an index measure of an individual security's variability relative to the market. A beta less than 1.0 indicates lower variability while a beta greater than 1.0 indicates greater variability than the market.

The CAPM assumes that all other risk, i.e., all non-market or unsystematic risk, can be eliminated through diversification. The risk that cannot be eliminated through diversification is called market, or systematic, risk. The CAPM presumes that investors require compensation for risks that cannot be eliminated through diversification. Systematic risks are caused by macroeconomic and other events that affect the returns on all assets. Essentially, the model is applied by adding a risk-free rate of return to a market risk premium. This market risk premium is adjusted proportionately to reflect the systematic risk of the individual security relative to the market as measured by beta. The traditional CAPM model is expressed as:

$$R_s = R_f + \beta(R_m - R_f)$$

Where:

R_s	=	Return rate on the common stock
R_f	=	Risk-free rate of return
R_m	=	Return rate on the market as a whole
β	=	Adjusted beta (volatility of the security relative to the market as a whole)

Numerous tests of the CAPM have confirmed its validity. These tests have measured the extent to which security returns and betas are related as predicted by the CAPM. However, Morin observes that while the results support the notion that beta is related to security returns, it has been determined that the empirical Security Market Line (SML) described by the CAPM is not as steeply sloped as the predicted SML. Morin[21] states:

> With few exceptions, the empirical studies agree that ... low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than predicted.
>
> * * *
>
> Therefore, the empirical evidence suggests that the expected return on a security is related to its risk by the following approximation:
>
> $$K = R_F + x\,\beta(R_M - R_F) + (1-x)\;\beta(R_M - R_F)$$
>
> where x is a fraction to be determined empirically. ...the value of x that best explains the observed relationship is between 0.25 and 0.30. If x = 0.25, the equation becomes:
>
> $$K = R_F + 0.25(R_M - R_F) + 0.75\,\beta(R_M - R_F)$$ [22]

In view of theory and practical research, I have applied both the traditional CAPM and the empirical CAPM to the companies in the proxy groups and averaged the results.

2. Risk-Free Rate of Return

Q. Please describe your selection of a risk-free rate of return.

A. My applications of the traditional and empirical CAPM are summarized on Schedule PMA-11, page 1. As shown on Line Nos. 1 and 4, the risk-free rate adopted for both applications is 5.5%. It is based upon the average consensus forecast of the reporting economists in the April 1, 2005 Blue Chip Financial Forecasts as shown in Note 2, page 4, of the expected yields on long-term U.S.

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21 Id., at p. 321.

22 Id., at pp. 335-336.

Treasury bonds for the six quarters ending with the third calendar quarter 2006.

Q. Why is the prospective yield on long-term U.S. Treasury Bonds appropriate for use as the risk-free rate?

A. The yield on long-term T-Bonds is almost risk-free and its term is consistent with the long-term cost of capital to public utilities measured by the yields on A rated public utility bonds, and is consistent with the long-term investment horizon inherent in utilities' common stocks. Therefore, it is consistent with the long-term investment horizon presumed in the standard DCF model employed in regulatory ratemaking. Moreover, Morin[23] states:

> Equity investors generally have an investment horizon far in excess of fifty days. More importantly, the short-term T-bill yields reflect the impact of factors different from those influencing long-term securities, such as common stock. For example, the premium for expected inflation absorbed into 90-day Treasury bills is likely to be far different than the inflationary premium absorbed into long-term securities yields. The yields on long-term Treasury bonds match more closely with common stock returns. *For investors with a long time horizon, a long-term government bond is almost risk-free.* (italics added)

In addition, Ibbotson Associates note in their Valuation Edition 2005 Yearbook[24]

> The horizon of the chosen Treasury security should match the horizon of whatever is being valued. When valuing a business that is being treated as a going concern, the appropriate Treasury yield should be that of a long-term Treasury bond. Note that the horizon is a function of the investment, not the investor. If an investor plans to hold stock in a company for only five years, the

23 Id., at p. 308.

24 Id., p. 57.

yield on a five-year Treasury rate would not be appropriate since the company will continue to exist beyond those five years.

In conclusion, the average expected yield on long-term Treasury Bonds is the appropriate proxy for the risk-free rate in the CAPM because it is less volatile than yields on Treasury Bills, is almost risk-free as noted by Morin above and is consistent with the long-term investment horizon implicit in common stocks.

3. Market Equity Risk Premium

Q. Please explain the estimation of the expected equity risk premium for the market.

A. First, I estimate investors' expected total return rate for the market. Then I estimate the expected risk-free rate which I subtract from the expected total return rate for the market. The result is an expected equity risk premium for the market, some proportion of which must be allocated to the companies in the proxy group through the use of beta. As a measure of risk relative to the market as a whole, the beta is an appropriate means by which to apportion the market risk premium to a specific company or group.

As shown on Schedule PMA-11, page 1, Line No. 2, the proportional market equity risk premium, based on the traditional CAPM, is 4.4% for the proxy group of six AUS Utility Reports water companies and 4.7% for the proxy group of three Value Line (Std. Ed.) water companies. Applying the empirical CAPM results in an equity risk premium of 4.9% for the six AUS Utility Reports water companies and 5.1% for the three Value Line (Std. Ed.) water companies as shown on Line No. 5 on page 1 of Schedule PMA-11. The total market equity risk premium utilized was 6.4% and is based upon an average of the long-term historical and projected market risk premia.

The basis of the projected median market equity risk premium is explained in detail in Note 1 on page 3 of Schedule PMA-11. As previously discussed, it is derived from an average of the most recent 3-month (using the months of January 2005 through March 2005) and a recent spot (March 25, 2005) 3 - 5 year median total market price appreciation projections from Value Line, and the long-term historical average from Ibbotson Associates. The appreciation projections by Value Line plus average dividend yield equate to a forecasted annual total return rate on the market of 11.0%. The long-term historical return rate of 12.4% on the market as a whole is from Ibbotson Associates' Stocks, Bonds, Bills and Inflation – Valuation Edition 2005 Yearbook. In each instance, the relevant risk-free rate was deducted from the total market return rate. For example, from the Value Line projected total market return of 11.0%, the forecasted average risk-free rate of 5.5% was deducted indicating a forecasted market risk premium of 5.5%. From the Ibbotson Associates' long-term historical total return rate of 12.4%, the long-term historical income return rate on long-term U.S. Government Securities of 5.2% was deducted indicating an historical equity risk premium of 7.2%. Thus, the average of the projected and historical total market risk premia of 5.5% and 7.2%, respectively, is 6.35%, rounded to 6.4%.

Q What are the results of your applications of the traditional and empirical CAPM to the proxy groups?

A. As shown on Schedule PMA-11, Line No. 3 of page 1, the traditional CAPM cost rate is 9.9% for the proxy group of six AUS Utility Reports water companies and 10.2% for the proxy group of three Value Line (Std. Ed.) water companies. And, as shown on Line No. 6 of page 1, the empirical CAPM cost rate is 10.4% for the six water companies and 10.6% for the three Value Line (Std. Ed.) water companies. The traditional and empirical CAPM cost rates are shown individually by company on pages 2 and 3 of Schedule PMA-11. As shown on Line No. 7, the CAPM cost rate applicable to the proxy group of six AUS Utility Reports water companies is 10.2% and 10.4% applicable to the proxy group of three Value Line (Std. Ed.) water companies based upon the traditional and empirical CAPM results.

Q. Some critics of the ECAPM model claim that using adjusted betas in a traditional CAPM amounts to using an ECAPM. Is such a claim valid?

A. No. Frank J. Hanley, President, AUS Consultants - Utility Services and a colleague of mine, has been in communication with Dr. Roger A. Morin of Georgia State University and the author of Regulatory Finance – Utilities' Cost of Capital (1994, Public Utility Reports, Inc., Arlington, VA). Via e-mail, Dr. Morin has indicated that the ECAPM compensates for CAPM's inherent bias by ascribing a higher intercept and flatter slope to CAPM. It is not an attempt to increase beta. In his e-mail of August 31, 2000, Dr. Morin states:

> There are two distinct separate issues involved when implementing the CAPM. First, given the validity of the standard CAPM, what is the best proxy for expected beta? Second, and more fundamentally, does the standard form of the CAPM provide the best explanation of the risk-return relationship observed on capital markets?

Regarding the standard, or traditional, CAPM, Dr. Morin also states:

> There have been countless empirical tests of the CAPM to determine to what extent security returns and betas are related in the manner predicted by the CAPM. The results of the tests support the idea that beta is related to security returns, that the risk-return tradeoff is positive, and that the relationship is linear. The contradictory finding is that the risk-return tradeoff is not as steeply sloped as the predicted CAPM. That is, low-beta securities earn returns somewhat higher than the CAPM would predict, and high-beta securities earn less than

> predicted. This is one of the most well-known results in finance. A CAPM-based estimate of cost of capital underestimates the return required from low-beta securities and overstates the return from high-beta securities, based on the empirical evidence. The empirical form of the CAPM refines the standard form of the CAPM to account for this phenomenon.
>
> Thus, I do not share the view that the ECAPM is equivalent to a beta adjustment. For utility stocks with betas less than one, the CAPM understates the return. The ECAPM allows for the CAPM's inherent bias by ascribing a higher intercept and flatter slope to the CAPM. The ECAPM is a return (Y-axis, vertical axis) adjustment. It is not a beta risk (X-axis, horizontal) adjustment. The ECAPM is not an attempt to increase the beta estimate, which would be a horizontal x-axis adjustment. The ECAPM is a return adjustment rather than a risk adjustment. (emphasis added.)

Dr. Morin also indicates in his correspondence with Mr. Hanley that there "is a huge financial literature which supports both the use of the ECAPM and the use of adjusted betas."

Moreover, regulatory support for the ECAPM can be found in the New York Public Service Commission's Generic Financing Docket, Case 91-M-0509. In addition, the Regulatory Commission of Alaska (RCA) in its Order No. 151 in Docket No. P-97-4 re: In the Matter of the Correct Calculation and Use of Acceptable Input Data to Calculate the 1997, 1998, 1999, 2000, 2001 and 2002 Tariff Rates for the Intrastate Transportation of Petroleum over the TransAlaska Pipeline System notice:

> Although we primarily rely upon Tesoro's recommendation, we are concerned, however, about Tesoro's CAPM analysis. Tesoro averaged the results it obtained from CAPM and ECAPM while at the same time providing empirical testimony[604] that the ECAPM results are more accurate then [sic] traditional CAPM results. The reasonable investor would be aware of these empirical results. Therefore, we adjust Tesoro's recommendation to reflect only the ECAPM result.

Moreover, the slope of the Security Market Line (SML) should not be confused with beta. As Eugene F. Brigham, finance professor emeritus and the author of many financial textbooks states[25]:

> The slope of the SML reflects the degree of risk aversion in the economy – the greater the average investor's aversion to risk, then (1) the steeper is the slope of the line, (2) the greater is the risk premium for any risky asset, and (3) the higher is the required rate of return on risky assets.[12]
>
> [12]Students sometimes confuse beta with the slope of the SML. This is a mistake. As we saw earlier in connection with Figure 6-8, and as is developed further in Appendix 6A, beta does represent the slope of a line, but *not* the Security Market Line. This confusion arises partly because the SML equation is generally written, in this book and throughout the finance literature, as $k_i = R_F + b_i(k_M - R_F)$, and in this form b_i looks like the slope coefficient and $(k_M - R_F)$ the variable. It would perhaps be less confusing if the second term were written $(k_M - R_F)b_i$, but this is not generally done.

In view of the foregoing, using adjusted betas in an ECAPM analysis is not incorrect, nor inconsistent with the financial literature. Rather, the use of the traditional CAPM results in an understated estimate of the cost of common equity capital for a utility with an adjusted beta below 1.00. And notwithstanding regulatory support for the use of only the ECAPM, my CAPM analysis, which includes both the traditional CAPM and the ECAPM, is a conservative approach resulting in a reasonable estimate of the cost of common equity

E. Comparable Earnings Model (CEM)

1. Theoretical Basis

Q. Please describe your application of the Comparable Earnings Model and how it is used to determine common equity cost rate.

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[25] Eugene F. Brigham, Financial Management – Theory and Practice, 4th Ed., The Dryden Press, 1985, p. 203.

A. My application of the CEM is summarized on Schedule PMA-12 which consists of six pages. Pages 1 and 2 show the CEM results for the proxy group of six AUS Utility Reports water companies and pages 3 and 4 show the CEM results for the proxy group of three Value Line (Std. Ed.) water companies. Pages 5 and 6 contain notes related to pages 1 through 4.

The comparable earnings approach is derived from the "corresponding risk" standard of the landmark cases of the U.S. Supreme Court. Therefore, it is consistent with the Hope doctrine that the return to the equity investor should be commensurate with returns on investments in other firms having corresponding risks.

The CEM is based upon the fundamental economic concept of opportunity cost which maintains that the true cost of an investment is equal to the cost of the best available alternative use of the funds to be invested. The opportunity cost principle is also consistent with one of the fundamental principles upon which regulation rests: that regulation is intended to act as a surrogate for competition and to provide a fair rate of return to investors.

The CEM is designed to measure the returns expected to be earned on the book common equity, in this case net worth, of similar risk enterprises. Thus, it provides a direct measure of return, since it translates into practice the competitive principle upon which regulation rests. In my opinion, it is inappropriate to use the achieved returns of regulated utilities of similar risk because to do so would be circular and inconsistent with the principle of equality of risk with non-price regulated firms.

The difficulty in application of the CEM is to select a proxy group of companies which are similar in risk, but are not price regulated utilities. Consequently, the first step in determining a cost of common equity using the comparable earnings model is to choose an appropriate proxy group of non-price regulated firms. The proxy group should be broad-based in order to obviate any company-specific aberrations. As stated previously, utilities need to be eliminated to avoid circularity since the returns on book common equity of utilities are substantially influenced by regulatory awards and are therefore not representative of the returns that could be earned in a truly competitive market.

2. <u>Application of the CEM</u>

Q. Please describe your application of the CEM.

A. My application of the CEM is market-based in that the selection of non-price regulated firms of comparable risk is based upon statistics derived from the market prices paid by investors.

I have chosen three proxy groups of domestic, non-price regulated firms to reflect both the systematic and unsystematic risks of the proxy group of six AUS Utility Reports water companies and the proxy group of three Value Line (Std. Ed.) water companies, respectively. The proxy group of ninety-one non-utility companies similar in risk to the proxy group of six AUS Utility Reports water companies and ninety non-utility companies similar in risk to the proxy group of three Value Line (Std. Ed.) water companies are listed on pages 1 through 4, Schedule PMA-12. The criteria used in the selection of these proxy companies were that they be domestic non-utility companies and have a meaningful rate of return on net worth, common equity or partners' capital reported in Value Line (Standard Edition) for each of the five years ended 2003, or projected for 2007-2009. Value Line betas were used as a measure of systematic risk. The standard error of the regression was used as a measure of each firm's specific, i.e., unsystematic risk. The standard error of the regression reflects the extent to which events specific to a company's operations will affect its stock price and, therefore, is a measure of diversifiable, unsystematic, company-specific risk. *In essence, companies which have similar betas and standard errors of the regressions, have similar investment risk, i.e., the sum of systematic (market) risk as reflected by beta and unsystematic (business and financial) risk, as reflected by the standard error of the regression, respectively. Those statistics are derived from regression analyses using market prices which, under the EMH reflect all relevant risks. The application of these criteria results in proxy groups of non-price regulated firms similar in risk to the average company in each proxy group.*

Using a Value Line, Inc. database dated March 15, 2005, the proxy group of ninety-one non-price regulated companies were chosen based upon ranges of unadjusted beta and standard error of the regression. The ranges were based upon the average standard deviations of the unadjusted beta and the average standard error of the regression for the proxy group of six AUS Utility Reports water companies.

The six AUS Utility Reports water companies in the proxy group have an average unadjusted beta of 0.47 whose standard deviation is 0.0986 as of March 15, 2005, as shown on page 2, Schedule PMA-12. The average standard error of the regression is 3.6278 as also shown on Schedule PMA-12, page 2 with a standard deviation of 0.1594 as derived in Note 5, page 5 of Schedule PMA-12. Ranges of unadjusted betas from 0.17 to 0.77 and of standard errors of the regression from 3.1496 to 4.1060 were used to select the proxy group of ninety-one domestic non-utility companies comparable to the profile of the proxy group of six AUS Utility Reports water companies as can be gleaned from pages 1 and 2 and explained in Note 1 on page 5 of Schedule PMA-12. These ranges are based upon the proxy group's average unadjusted beta of 0.47 and average standard error of the regression of 3.6278 plus or minus three standard deviations of beta (0.0986 x 3 = 0.2958) and standard error of the regressions (0.1594 x 3 = 0.4782). The use of three standard deviations assures capturing 99.73% of the distribution of unadjusted betas and standard errors, assuring comparability.

Likewise, using the same Value Line, Inc. database dated March 15, 2005, the proxy group of ninety non-price regulated companies were chosen based upon ranges of unadjusted beta and standard error of the regression. The ranges were based upon the average standard deviations of the unadjusted beta and the average standard error of the regression for the proxy group of three Value Line (Std. Ed.) water companies.

The three Value Line (Std. Ed.) water companies in the proxy group have an average unadjusted beta of 0.55 whose standard deviation is 0.0930 as of March 15, 2005, as shown on page 4, Schedule PMA-12. The average standard error of the regression is 3.5004 as also shown on Schedule PMA-12, page 4 with a standard deviation of 0.1538 as derived in Note 10, page 6 of Schedule PMA-12. Ranges of unadjusted betas from 0.27 to 0.83 and of standard errors of the regression from 3.0390 to 3.9618 were used to select the proxy group of ninety domestic non-utility companies comparable to the profile of the proxy group of three Value Line (Std. Ed.) water companies as can be gleaned from pages 3 and 4 and explained in Note 9 on pages 5 and 6 of Schedule PMA-12. These ranges are based upon the proxy group's average unadjusted beta of 0.55 and average standard error of the regression of 3.5004 plus or minus three standard deviations of beta (0.0930 x 3 = 0.2790) and standard error of the regressions (0.1538 x 3 = 0.4614). The use of three standard deviations assures capturing 99.73% of the distribution of unadjusted betas and standard errors, assuring comparability.

I believe that this methodology for selecting non-price regulated firms of similar total risk (i.e., non-diversifiable systematic and diversifiable non-systematic risk) is meaningful and effectively responds to the criticisms normally associated with the selection of firms presumed to be comparable in total risk. This is because the selection of non-price regulated companies comparable in total risk is based upon regression analyses of market prices which reflect investors' assessment of all risks, diversifiable and non-diversifiable. Thus, the empirical selection process results in companies comparable in both systematic and unsystematic risks, i.e., total risk.

Once proxy groups of non-price regulated companies are selected, it is then necessary to derive returns on book common equity, net worth or partners' capital for the companies in the groups. I have measured these returns using the rate of return on net worth, common equity or partners' capital reported by Value Line (Standard Edition). It is reasonable to measure these returns over both the most recent historical five-year period as well as those projected over the ensuing five-year period.

Q. What are your conclusions of CEM cost rate?

A. Conclusions of CEM cost rates are 17.7% for the proxy group of six AUS Utility Reports water companies as shown on page 2 of Schedule PMA-12 and 16.8% for the proxy group of three Value Line (Std. Ed.) water companies as shown on page 4. Note that I have applied a test of significance (Student's t-statistic) to determine whether any of the historical or projected returns are significantly different from their respective means at the 95% confidence level. As a result, the historical and the projected means of several companies have been excluded.

I have also eliminated from the groups of non-price regulated companies, all those rates of return which are greater than 20.0% or less than 200 basis points above the current prospective yield of 6.6% on Moody's A rated public utility bonds (see page 1 of Schedule PMA-10), or 8.6% for reasons discussed previously. Such an elimination results in an arithmetic mean return rate of 14.9% on an historical five-year and 14.0% on a projected five-year basis for the six AUS Utility Reports water companies and 14.7% on an historical five-year basis and 14.0% on a projected five-year basis for the three Value Line (Std. Ed.) water companies as shown on pages 2 and 4 of Schedule PMA-12, respectively. I rely upon the midpoint of the arithmetic mean historical five-year and projected five-year rates of return of 14.5% and 14.4% as my CEM conclusions for each proxy group, respectively.

IX. CONCLUSION OF COMMON EQUITY COST RATE RANGE

Q. What is your recommended common equity cost rate range?

A. It is 11.40% to 11.50% based upon the common equity cost rates resulting from all four cost of common equity models consistent with the EMH which logically mandates the use of multiple cost of common equity models as adjusted for CWS's greater investment risk.

In formulating my recommended common equity cost rate range of 11.40% to 11.50%, I reviewed the results of the application of four different cost of common equity models, namely, the DCF, RPM, CAPM, and CEM for the three proxy groups. I employ all four cost of common equity models as primary tools in arriving at my recommended common equity cost rate because no single model is so inherently precise that it can be relied upon solely, to the exclusion of other theoretically sound models. As discussed above, all four models are based upon the Efficient Market Hypothesis (EMH), and therefore, have application problems associated with them. The EMH, as also previously discussed, requires the assumption that investors rely upon multiple cost of common equity models. Moreover, as demonstrated in this testimony, the prudence of using multiple cost of common equity models is supported in the financial literature. Therefore, none should be relied upon exclusively to estimate investors' required rate of return on common equity.

In a market environment where market value deviates significantly from book value (lower or higher), sole reliance on the DCF model is problematic for a regulated utility because its application results in an overstatement or understatement, respectively, of investors' required rate of return. Investors expect to achieve their required rate of return based upon dividends received <u>and appreciation in market price</u>. This testimony has shown that market prices are significantly influenced by factors other than earnings per share (EPS) and dividends per share (DPS). Thus, because it is necessary to use accounting proxies for growth in the DCF model (such as EPS, DPS, or their derivative, internal growth), that model does not reflect the full extent of market price growth expected by investors. Market prices reflect other factors affecting growth not accounted for in the standard regulatory version of the DCF model such as an increase in the market value per share due to expected increases in price/earnings multiples and less obvious factors included in the long-range goals of investors. For these reasons, sole reliance on the DCF model should be avoided. In fact, as discussed in detail above, state commissions in Iowa, Indiana and Hawaii, which have previously relied primarily upon the DCF, have explicitly recognized this tendency of the DCF model to understate the common equity cost rate when, as now, market prices significantly exceed book values.

The results of the four cost of common equity models applied to the proxy groups of six AUS Utility Reports water companies and three Value Line (Std

Ed.) water companies are shown on Schedule PMA-1, page 2 and summarized below:

Table 4

	Proxy Group of Six AUS Utility Reports Water Cos.		Proxy Group of Three Value Line (Std. Ed.) Water Cos.
Discounted Cash Flow Model	10.6%		10.8%
Risk Premium Model	10.6		10.8
Capital Asset Pricing Model	10.2		10.4
Comparable Earnings Model	14.5		14.4
Indicated Range of Common Equity Cost Rate Before Investment Risk Adjustment	10.90%	-	11.00%
Investment Risk Adjustment	0.50		0.50
Recommended Range of Common Equity Cost Rate After Adjustment for Investment Risk	11.40%	-	11.50%

Based upon these common equity cost rate results, I conclude that a range of common equity cost rate of 10.90% to 11.00% is indicated based upon the use of multiple common equity cost rate models applied to the market data of both proxy groups and before any adjustment for CWS's greater relative investment risk as shown on Line No. 5, page 2 of Schedule PMA-1.

However, as discussed previously, CWS has greater investment risk than the average proxy group company because of its small size vis-à-vis each proxy group, whether measured by book capitalization or the market capitalization of common equity (estimated market value for CWS, whose common stock is not traded) and its greater financial risk. Therefore, it is necessary to upwardly adjust the range of indicated common equity cost rate of 10.90 to 11.00% based upon the two proxy groups, respectively.

Based upon CWS's small relative size, an adjustment to reflect its smaller relative size of 4.05% (405 basis points) relative to the indicated common equity cost rate of the six AUS Utility Reports water companies and 4.73% (473 basis points) relative to the indicated common equity cost rate of the three Value Line (Std. Ed.) water companies are indicated. These adjustments are based upon data contained in Chapter 7 entitled "Firm Size and Return" from Ibbotson Associates' <u>Stocks, Bonds, Bills and Inflation-Valuation Edition 2005 Yearbook</u>. The determinations are based on the size premia for decile portfolios of New York Stock Exchange (NYSE), American Stock Exchange (AMEX) and NASDAQ listed companies for the 1926-2004 period and related data shown on pages 3 through 18 of Schedule PMA-1. The average size premia for the deciles in which the proxy groups fall have been compared to the average size premia for the 10th decile in which CWS would fall if its stock were traded and sold at the March 28, 2005 average market/book ratio of either 232.8% or 238.5% experienced by each proxy group, respectively. As shown on page 3 of Schedule PMA-1, the size premium spread between CWS and the six water companies is 4.05% and 4.73% between CWS and the three Value Line (Std. Ed.) water companies. Page 4 contains notes relative to page 3. Page 5 contains data in support of page 3 while pages 6 through 18 of PMA-1 contain relevant information from the Ibbotson Associates' <u>Valuation Edition 2005 Yearbook</u> discussed previously.

Consequently, investment risk adjustments of 4.05% and 4.73% are indicated for the six AUS Utility Reports water companies and the three Value Line (Std. Ed.) water companies, respectively. However, I will make a conservatively reasonable investment risk adjustment of 0.50% (50 basis points) to the indicated common equity cost rate range of 10.90% and 11.00% to conservatively reflect CWS's greater relative investment risk due to its smaller size vis-à-vis the companies in both proxy groups.

Therefore, as shown on page 2 of Schedule PMA-1 at Line No. 7 and Table 4 above my recommended common equity cost rate range applicable to CWS, is 11.40% to 11.50%. In my opinion, such a cost rate is both reasonable and conservative.

Finally, due to CWS's greater financial risk as discussed previously, it is my opinion that the Commission should authorize CWS a return rate on common equity and overall return on rate base at the upper end of the range, i.e., 11.50% and 9.00%, respectively.

Q. Does that conclude your direct testimony?

A. Yes.

APPENDIX A

PROFESSIONAL QUALIFICATIONS

OF

PAULINE M. AHERN, CRRA
VICE PRESIDENT

AUS CONSULTANTS – UTILITY SERVICES

PROFESSIONAL QUALIFICATIONS
OF
PAULINE M. AHERN, CRRA
VICE PRESIDENT
AUS CONSULTANTS – UTILITY SERVICES

PROFESSIONAL EXPERIENCE

1996-Present

As a Vice President, I continue to prepare fair rate of return and cost of capital exhibits, as well as submitting testimony on same before state public utility commissions. I continue to provide assistance and support throughout the entire ratemaking litigation process.

As the Publisher of AUS Utility Reports (formerly C. A. Turner Utility Reports), I am responsible for the production, publishing, and distribution of the reports. AUS Utility Reports provides financial data and related ratios for about 200 public utilities, i.e., electric, combination gas and electric, natural gas distribution, natural gas transmission, telephone, and water utilities, on a monthly, quarterly and annual basis. Among the subscribers of AUS Utility Reports are utilities, many state regulatory commissions, federal agencies, individuals, brokerage firms, attorneys, as well as public and academic libraries. The publication has continuously provided financial statistics on the utility industry since 1930.

As the Publisher of AUS Utility Reports, I supervise the production, publishing, and distribution of the AGA Rate Service publications under license from the American Gas Association. I am also responsible for maintaining and calculating the performance of the AGA Index, a market capitalization weighted index of the common stocks of the approximately 70 corporate members of the AGA. In addition, I supervise the production of a quarterly survey of investor-owned water company rate case activity on behalf of the National Association of Water Companies.

1994-1996

As an Assistant Vice President, I prepared fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. These supporting exhibits include the determination of an appropriate ratemaking capital structure and the development of embedded cost rates of senior capital. The exhibits also support the determination of a recommended return on common equity through the use of various market models, such as, but not limited to, Discounted Cash Flow analysis, Capital Asset Pricing Model and Risk Premium Methodology, as well as an assessment of the risk characteristics of the client utility. I also assisted in the preparation of responses to any interrogatories received regarding such testimonies filed on behalf of client utilities. Following the filing of fair rate of return testimonies, I assisted in the evaluation of opposition testimony in order to prepare interrogatory questions, areas of cross-examination, and rebuttal testimony. I also evaluated and assisted in the preparation of briefs and exceptions following the hearing process. I have submitted testimony before state public utility commissions regarding appropriate capital structure ratios and fixed capital cost rates.

1990-1994

As a Senior Financial Analyst, I supervised two analysts in the preparation of fair rate of return and cost of capital exhibits which are filed along with expert testimony before various state and federal public utility regulatory bodies. The team also assisted in the preparation of interrogatory responses.

I evaluated the final orders and decisions of various commissions to determine whether further actions are warranted and to gain insight which may assist in the preparation of future rate of return studies.

I assisted in the preparation of an article authored by Frank J. Hanley and A. Gerald Harris entitled "Does Diversification Increase the Cost of Equity Capital?" published in the July 15, 1991 issue of Public Utilities Fortnightly.

I co-authored an article with Frank J. Hanley entitled "Comparable Earnings: New Life for an Old Precept" which was published in the American Gas Association's Financial Quarterly Review, Summer 1994.

I was awarded the professional designation "Certified Rate of Return Analyst" (CRRA) by the National Society of Rate of Return Analysts (now the Society of Utility and Regulatory Financial Analysts (SURFA)). This designation is based upon education, experience and the successful completion of a comprehensive examination.

As Administrator of Financial Analysis for AUS Utility Reports, which reports financial data for over 200 utility companies and has approximately 1,000 subscribers, I oversee the preparation of this monthly publication, as well as the annual publication, Financial Statistics - Public Utilities.

1988-1990

As a Financial Analyst, I assisted in the preparation of fair rate of return studies including capital structure determination, development of senior capital cost rates, as well as the determination of an appropriate rate of return on equity. I also assisted in the preparation of interrogatory responses, interrogatory questions of the opposition, areas of cross-examination and rebuttal testimony. I also assisted in the preparation of the annual publication C. A. Turner Utility Reports - Financial Statistics - Public Utilities.

1973-1975

As a research assistant in the Research Department of the Regional Economics Division of the Federal Reserve Bank of Boston, I was involved in the development and maintenance of econometric models to simulate regional economic conditions in New England in order to study the effects of, among other things, the energy crisis of the early 1970's and property tax revaluations on the economy of New England. I was also involved in the statistical analysis and preparation of articles for the New England Economic Review. Also, I acted as assistant editor for New England Business Indicators.

1972

As a research assistant in the Office of the Assistant Secretary for International Affairs, U.S. Treasury Department, Washington, D.C., I developed and maintained econometric models which simulated the economy of the United States in order to study the results of various alternate foreign trade policies so that national trade policy could be formulated and recommended.

I am also a member of the Society of Utility and Regulatory Financial Analysts (formerly the National Society of Rate of Return Analysts).

Clients Served

I have offered expert testimony before the following commissions:

Arkansas
California
Delaware
Florida
Hawaii
Idaho
Illinois
Indiana
Maine
Maryland
Michigan
Missouri
New Jersey
New York
North Carolina
Ohio
Pennsylvania
South Carolina
Virginia
Washington

I have sponsored testimony on the rate of return and capital structure effects of merger and acquisition issues for:

California-American Water Company
New Jersey-American Water Company

I have sponsored testimony on fair rate of return and related issues for:

Aqua Illinois, Inc.
Audubon Water Company
Carolina Pines Utilities, Inc.
Carolina Water Service, Inc.
Consumers Illinois Water Company
Consumers Maine Water Company
Consumers New Jersey Water Company
Elizabethtown Water Company
Emporium Water Company
GTE Hawaiian Telephone Inc.
Greenridge Utilities, Inc.
Long Neck Water Company
Middlesex Water Company
Missouri-American Water Company
Mt. Holly Water Company
Nero Utility Services, Inc.
New Jersey-American Water Company
Ohio-American Water Company
Pinelands Waste Water Company
Pittsburgh Thermal
Sussex Shores Water Company
Thames Water Americas
Tidewater Utilities, Inc.
Transylvania Utilities, Inc.
Twin Lakes Utilities, Inc.
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Rochelle, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Utilities, Inc. of Florida
Valley Energy, Inc.
Wellsboro Electric Company
Western Utilities, Inc.

I have sponsored testimony on capital structure and senior capital cost rates for the following clients:

Alpena Power Company
Arkansas-Western Gas Company
Associated Natural Gas Company
PG Energy Inc.
United Water Delaware, Inc.
Washington Natural Gas Company

I have assisted in the preparation of rate of return studies on behalf of the following clients:

Algonquin Gas Transmission Company
Arkansas-Louisiana Gas Company
Arkansas Western Gas Company
Artesian Water Company
Associated Natural Gas Company
Atlantic City Electric Company
Bridgeport-Hydraulic Company
Cambridge Electric Light Company
Carolina Power & Light Company
Citizens Gas and Coke Utility
City of Vernon, CA
Columbia Gas/Gulf Transmission Cos.
Commonwealth Electric Company
Commonwealth Telephone Company
Conestoga Telephone & Telegraph Co.
Connecticut Natural Gas Corporation
Consolidated Gas Transmission Company
Consumers Power Company
CWS Systems, Inc.
Delmarva Power & Light Company
East Honolulu Community Services, Inc.
Equitable Gas Company

Rate of Return Study Clients, Continued

Equitrans, Inc.
Florida Power & Light Company
Gary Hobart Water Company
Gasco, Inc.
GTE Arkansas, Inc.
GTE California, Inc.
GTE Florida, Inc.
GTE Hawaiian Telephone
GTE North, Inc.
GTE Northwest, Inc.
GTE Southwest, Inc.
Great Lakes Gas Transmission L.P.
Hawaiian Electric Company
Hawaiian Electric Light Company
IES Utilities Inc.
Illinois Power Company
Interstate Power Company
Iowa Electric Light and Power Company
Iowa Southern Utilities Company
Kentucky-West Virginia Gas Company
Lockhart Power Company
Middlesex Water Company
Milwaukee Metropolitan Sewer District
Mountaineer Gas Company
National Fuel Gas Distribution Corp.
National Fuel Gas Supply Corp.
Newco Waste Systems of NJ, Inc.
New Jersey-American Water Company
New Jersey Natural Gas Company
New York-American Water Company
North Carolina Natural Gas Corp.
Northumbrian Water Company
Ohio-American Water Company
Oklahoma Natural Gas Company
Orange and Rockland Utilities
Paiute Pipeline Company
PECO Energy Company
Penn-York Energy Corporation
Pennsylvania-American Water Co.
PG Energy Inc.
Philadelphia Electric Company
South Carolina Pipeline Company
Southwest Gas Corporation
Stamford Water Company
Tesoro Alaska Petroleum Company
United Telephone of New Jersey
United Utility Companies
United Water Arkansas, Inc.
United Water Delaware, Inc.
United Water Idaho, Inc.
United Water Indiana, Inc.
United Water New Jersey, Inc.
United Water New York, Inc.
United Water Pennsylvania, Inc.
United Water Virginia, Inc.
United Water West Lafayette, Inc.
Vista-United Telecommunications Corp.
Washington Natural Gas Company
Washington Water Power Corporation
Waste Management of New Jersey –
Transfer Station A
Wellsboro Electric Company
Western Reserve Telephone Company
Western Utilities, Inc.

EDUCATION:

1973 – Clark University – B.A. – Honors in Economics
1991 – Rutgers University – M.B.A. – High Honors

PROFESSIONAL AFFILIATIONS:

Society of Utility and Regulatory Financial Analysts (serve as Secretary/Treasurer from 2004-2006)
Energy Association of Pennsylvania
National Association of Water Companies – Member of the Finance Committee